

REMARKS

Applicants have cancelled withdrawn claims 60-62 without prejudice. Applicants have amended claim 55 based on the disclosure, for example, at page 9, line 25 - page 10, line 1, of the specification. Applicants have also amended claims 67 and 84 to recite limitations inherent in the language of original claims 67 and 84. New claim 97 finds support, for example, at page 18, lines 4-16, of the specification and in FIGS. 10A and 10B of the application.

Claims 55-59 and 63-66 have been rejected under 35 USC 112, first paragraph, for lack of written description. Applicants respectfully traverse this rejection.

Claim 55 as amended in the Amendment filed December 12, 2008, stated that the first high concentration impurity region is closer to the bonding pad than the second high concentration impurity region but not in contact with the bonding pad so as to provide a Schottky junction between the first high concentration impurity region and the bonding pad, and is configured to be electrically connected to the bonding pad through the Schottky junction so as to permit the current flow upon the application of the electrostatic energy.

In the Amendment filed December 12, 2008, applicants explained that the amendment is supported by the disclosure at page 9, line 18 - page 10, line 1, of the specification. For example, the specification explains at page 9, lines 25-39, "In all of the cases illustrated in Figs. 3(B), 3(C), and 3(D), the metal electrodes 204s are *not connected directly with* the first and/or the second n⁺-type regions 201 and 202. The metal electrodes 204s may thus have structures that form *Schottky junctions* with the substrate approximately 0 μ m to 5 μ m to the outer side from the ends of the first and/or the second n⁺-type regions 201 and 202." (Emphasis added).

This passage and FIGS. 3(B)-3(D) of the application provide support for the limitation that the first high concentration impurity region (201) is not in contact with the bonding pad (204) so as to provide a Schottky junction that is formed somewhere between the first high concentration impurity region (201) and the bonding pad (204). In this example, that Schottky junction is formed between the substrate (101) and the bonding pad (204) approximately 0 μ m to 5 μ m away from the edge of the first high concentration impurity region (201).

The Examiner contends at page 2 of the Action:

First, a Schottky junction is by definition a junction between a metal and a material with a bandgap such as a semiconductor. There is no direct connection or junction between the bonding pad and the high impurity concentration region *forming* a Schottky junction. There can also be no “Schottky junction” between the first high impurity concentration region and the bonding pad as they are supposedly “not in contact” (claim 55 line 14). Also, in applicant’s disclosure contact between a metal and the high concentration impurity region are [*sic*] “ohmic”. Contact between metals and low impurity or intrinsic semiconductor regions are [*sic*] “Schottky”.

(Emphasis added).

Claim 55 in the Amendment filed December 12, 2008, did not say that a Schottky junction is *formed* between the first high concentration impurity region and the bonding pad. Rather, it said that a Schottky junction is provided somewhere between the first high concentration impurity region and the bonding pad. Accordingly, none of the facts pointed out by the Examiner in the passage above is inconsistent with the language of claim 55 in the previous Amendment. Rather, they support that language.

Solely to expedite prosecution, applicants have amended claim 55 to state that the first high concentration impurity region is electrically disconnected from the bonding pad except during the application of the electrostatic energy, physically separated from the bonding pad so as to form a Schottky junction between the bonding pad and a portion of the semi-insulating substrate in which the first high concentration impurity region is not formed.

The rejection of claims 55-59 and 63-66 for lack of written description should be withdrawn because the specification and drawings support the amendments to claim 55, as explained above.

The rejection of claims 55-59 and 63-66 under 35 USC 112, second paragraph, as indefinite, should be withdrawn as well because this rejection is based on the same reasoning as in the rejection for lack of written description.

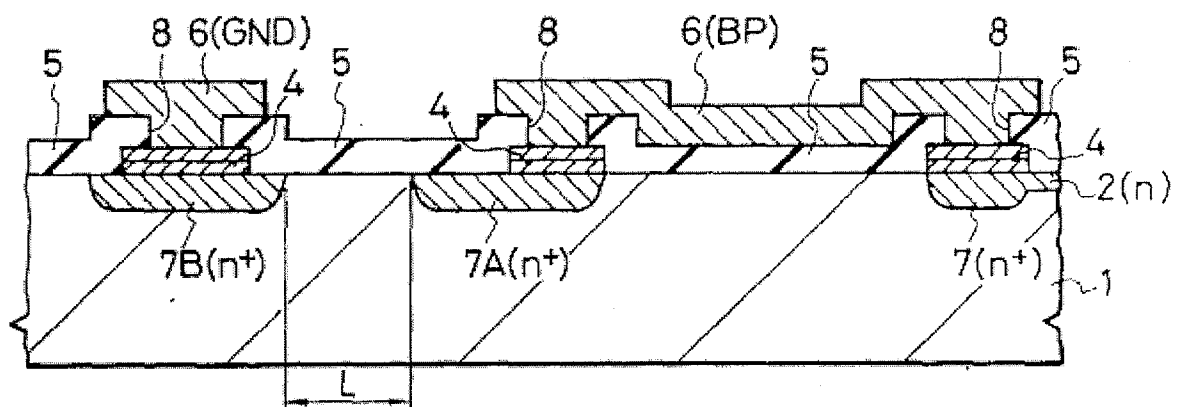
Claims 47-59 and 63-68, 70, 72, 73, 84, 85 and 87-93 have been rejected “under 35 USC 102(b) as anticipated by or, in the alternative, under 35 USC 103(a) as obvious over” U.S. Patent No. 4,803,527 (Hatta). Applicants respectfully traverse this rejection.

Claim 55 as amended states that the first high concentration impurity region is closer to the bonding pad than the second high concentration impurity region, electrically disconnected from the bonding pad except during the application of the electrostatic energy, physically separated from the bonding pad so as to form a Schottky junction between the bonding pad and a portion of the semi-insulating substrate in which the first high concentration impurity region is not formed, and configured to be electrically connected to the bonding pad through the Schottky junction so as to permit the current flow upon the application of the electrostatic energy.

The Examiner contends that Hatta's FIGS. 1-4 disclose the claimed invention. Specifically, the Examiner equates Hatta's n^+ type semiconductor region 7A to the claimed first high concentration impurity region and Hatta's bonding pad 6(BP) to the claimed bonding pad. See page 4 of the Action. Applicants respectfully disagree.

Applicants reproduce below Hatta's FIG. 2 for the Examiner's convenience.

FIG. 2



Hatta's n^+ type semiconductor region 7A, which the Examiner equates to the claimed first high concentration impurity region, and Hatta's bonding pad 6(B), which the Examiner equates to the claimed bonding pad, are connected by Hatta's metal layer 4, as shown in FIG. 2 above.

Accordingly, Hatta's n^+ type semiconductor region 7A and bonding pad 6(B) are electrically connected at all time. On the contrary, claim 55 requires that the first high

concentration impurity region be electrically disconnected from the bonding pad except during the application of the electrostatic energy. The claimed structure allows for formation of a Schottky junction adjacent the bonding pad, as recited in the claim and explained above with respect to the written description rejection.

Hatta does not teach or suggest the limitation that the first high concentration impurity region is electrically disconnected from the bonding pad except during the application of the electrostatic energy.

Claim 67 recites a protecting element for the transistor connected between the first bonding pad and the second bonding pad and states that the protecting element comprises a first high concentration impurity region, a second high concentration impurity region and an insulating region disposed between the first and second high concentration impurity regions and is configured to permit current flow between the first and second high concentration impurity regions upon application between the first bonding pad and the second bonding pad of an electrostatic energy that is larger than a predetermined amount.

The Examiner contends that Hatta's FIGS. 1-4 disclose the claimed invention. Specifically, the Examiner equates Hatta's semiconductor region 7(n+) to the claimed first high concentration impurity region and Hatta's semiconductor region 7A(n+) to the claimed second high concentration impurity region. The Examiner further contends that the claimed insulating region corresponds to "an insulating region (substrate material 1) between the two high [concentration impurity] regions." Applicants respectfully disagree.

Hatta's semiconductor region 7(n+), which the Examiner equates to the claimed first high concentration impurity region, is connected to Hatta's semiconductor region 7A(n+), which the Examiner equates to the claimed second high concentration impurity region, by Hatta's bonding pad 6(B). See Hatta's FIG. 2 reproduced above. Hatta's semiconductor region 7(n+) and semiconductor region 7A(n+) cannot be and are not high concentration impurity regions of a protecting element against electrostatic discharge, because they are electrically connected at all time. For the Examiner to understand this point, applicants have amended claim 67 to state that

the first and second high concentration impurity regions are electrically disconnected from each other except during the application of the electrostatic energy. Hatta fails to disclose this limitation, as explained above.

At page 5 of the Action, the Examiner states that “[t]here is clearly insulating material 1 and Schottky diodes between first 7A n+ and second 7 n+ region.” Applicants believe that in this statement the Examiner is referring to the plan view of Hatta’s FIG. 1 and saying that there are more than one semiconductor region 7A(n+) and more than one semiconductor region 7(n+). However, none of Hatta’s semiconductor regions shown in FIG. 1 corresponds to the high concentration impurity regions of the claimed protecting element.

Although Hatta’s FIG. 1 includes two reference numerals “7A(n+),” Hatta’s device includes only one semiconductor region 7A(n+), as shown in the sectional view of Hatta’s FIG. 2. Applicants are not sure what device component the Examiner is referring to by “*second 7 n+ region*.” There are eight semiconductor regions 7(n+) in Hatta’s FIG. 1. However, there is some type of electrical wiring between Hatta’s semiconductor region 7A(n+) and each of Hatta’s eight semiconductor regions 7(n+). See FIG. 1 of Hatta. Accordingly, Hatta’s semiconductor region 7A(n+) cannot form a protecting element with any of Hatta’s eight semiconductor regions 7(n+).

For the Examiner to understand this point, applicants have amended claim 67 to state that no electrical wiring exists between the first and second high concentration impurity regions.

Claim 84 as amended includes the same limitations as added to claim 67.

The rejection of claims 47-59 and 63-68, 70, 72, 73, 84, 85 and 87-93 under 35 USC 102(b) on Hatta or under 35 USC 103(a) over Hatta should be withdrawn because Hatta fails to disclose at least one element of each of the independent claims, as explained above.

In light of the above, a Notice of Allowance is solicited.

In the event that the transmittal letter is separated from this document and the Patent and Trademark Office determines that an extension and/or other relief is required, applicants petition for any required relief including extensions of time and authorize the Commissioner to charge

the cost of such petitions and/or other fees due in connection with the filing of this document to
Deposit Account No. 03-1952, referencing Docket No. **492322017300**.

Respectfully submitted,

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